

# What are Android Study Jams?

Android Study Jams are community-organized study groups  
for people to learn how to build Android apps  
using an online training course\*



\* Note: One session will utilize Kotlin Koans material

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# New to Programming Track

Learn the basics of building Android apps with the Kotlin programming language and develop a collection of simple apps to start your journey as an Android developer!

## Pre-requisites

- Basic computer literacy
- Basic math skills

## Curriculum used

Android Basics in Kotlin Course ([here](#)) with six pathways currently available! More to come.

# New to Programming Track

## What will you learn?

1

### Introduction to Kotlin

Learn to code in Kotlin, a modern programming language that helps developers be more productive.

(1 hour)

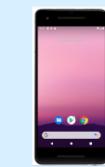


2

### Create your first Android app

Learn to create and run your first Android app in Android Studio.

(1 hour)



3

### Build a basic layout

Learn the basics of layouts in Android by creating your very own birthday card app!

(1 hour)



4

### Add a button to an app

Learn how to use classes, objects, and conditionals to create an interactive dice roller app.

(3 hours)



## Badges

Earn badges at the end of each pathway!



android

# New to Programming Track

What will you learn?

- 5 Get user input Learn how to get user input within an app (3 hours) by building a tip calculator app.



- 6 Display a scrollable list Learn how to display a list of text and images in an app. (3 hours)



More pathways for this course will be released in the future!

Badges



# Prior Programming Experience Track

First learn the essentials of the Kotlin programming language. Then learn the fundamentals of Android development and best practices by building a variety of Android apps in Kotlin.

## Pre-requisites

- Prior programming experience in an object-oriented programming language
- Familiar with how to use an IDE
- Familiar with GitHub

## Curriculum used

Start off with [Kotlin Koans](#) exercises to become familiar with Kotlin syntax and language features. If attendees are already familiar with the Kotlin programming language, they can skip this step. Then begin the [Android Kotlin Fundamentals course](#) which has ten pathways available.

- Kotlin Koans ([here](#))
- Android Kotlin Fundamentals ([here](#))

# Prior Programming Experience Track

## What will you learn?

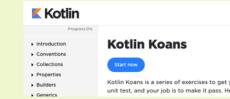


1

### Kotlin Koans

Go through a series of exercises to become familiar with basic Kotlin language features.

(2 hours)



Badges

Earn badges at the end of each pathway!

(No badge for pre-work)



2

### Build an interactive app

Learn the basic anatomy of an Android app project, how to add images to your app, and how to enable backward compatibility of an app while creating a Dice Roller app.

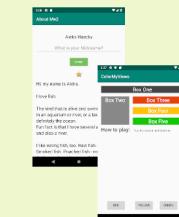
(1 hours)



### Layouts

Create different types of layouts, add user interactivity, and use data binding while creating two apps.

(1 hours)



android

# Prior Programming Experience Track

## What will you learn?

4

### Navigation

Learn how multi-screen navigation works by creating a fragment, define navigation paths, and start an external activity through developing a trivia app.

(3 hours)



5

### Activity and Fragment lifecycles

Learn about Activity and Fragment lifecycles, how to handle complex lifecycle situations, and use logging to help debug and track the state of the app by creating the Dessert Clicker app that will preserve its state on rotation.

(2 hours)



6

### Architecture components

Learn about ViewModel, LiveData, data binding with ViewModel and LiveData, and LiveData transformations by completing a charades game app.

(3 hours)



7

### Databases and RecyclerView

Create a database using the Room library, use coroutines to simplify asynchronous programming, and display a list with RecyclerView in the TrackMySleep app.

(4 hours)



Badges



android

# Prior Programming Experience Track

## What will you learn?

Badges

8

### Connect to the internet

Learn how to get data and images from the internet and display them in the app by developing a MarsRealEstate app.

(2 hours)



9

### Repository and WorkManager

Create a repository, add an offline cache, and schedule background tasks with WorkManager by completing an app called DevBytes, handling background processes with best practices.

(2 hours)



10

### Design for everyone

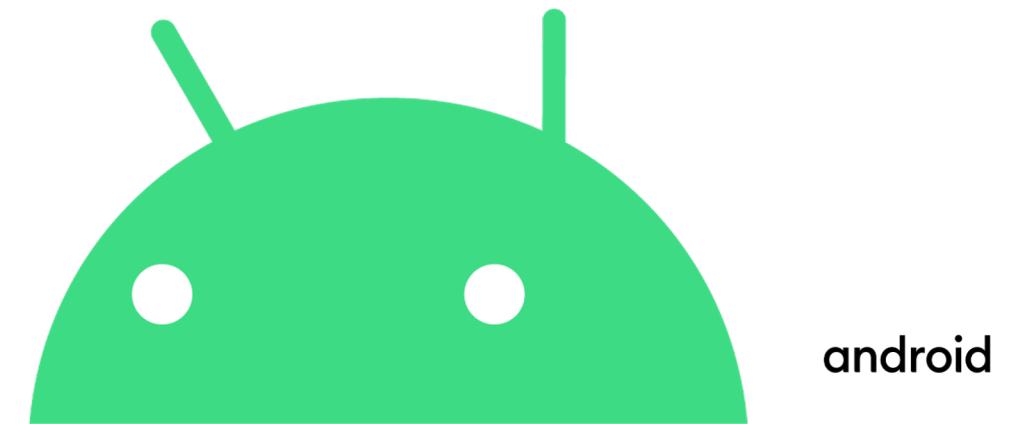
Learn the basics of Android's styling system, how to apply Material Design principles to the UI of your app, and how to make your app more accessible for all users by creating a Google Developer Groups Finder app.

(2 hours)



# Learning Objectives

- Learn the essentials of the Kotlin programming language
- Build a variety of Android apps
- Best practices for Android development
- Discover resources to continue learning



**What's your favorite programming  
language and why?**

# Feature Highlight

No more nulls. The big difference between Kotlin and Java

# Null Safety is here to stay

- Tony Hoare, who famously developed the *Quick Sort* algorithm regards the null reference as a ‘billion dollar mistake’
- Kotlin partially does away with the *null reference* by introducing a **type system that differentiates between nullable and non-nullable references**. For example:

```
var foo: String = "Hello World!"  
foo = null // compilation error  
  
var bar: String? = "This is nullable"  
bar = null // okay
```



# Concept Overview

What is Kotlin?

**Kotlin is a modern programming language that helps developers be more productive.**

# Android Development is Kotlin-First



**Let's dive into  
some code..**

# What does this code do?

```
fun main() {  
    println("Hello world!")  
}
```

# What does this code do?

```
fun main() {  
    println("Hello world!")  
}
```

```
>>> Hello world!
```

# What do you notice about Kotlin?

```
fun main() {  
    println("Hello world!")  
}
```

# Parameters and Return Type

```
fun add(a: Int, b: Int): Int {  
    return a + b  
}  
  
fun display(): Unit {  
    println("Welcome")  
}
```

mutable variable

```
var counter: Int = 5
```

immutable variable

```
val name: String = "Rebecca"
```

# What's interesting about these variable declarations?

```
var length = 5
```

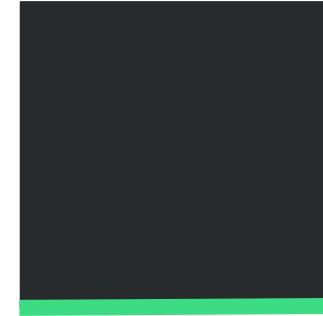
```
val message = "Welcome"
```

```
if (score < 20) {  
    println("Low")  
} else if (score < 70) {  
    println("Medium")  
} else {  
    println("High")  
}
```

```
when (x) {  
    0 -> endGame()  
    1 -> moveNext()  
    2 -> skipTurn()  
}
```

# Classes

```
// This is the Square class  
// definition  
class Square(val side: Int)  
  
// This is a Square instance  
val s = Square(10)  
println(s.side)
```



side

# Collections

```
val numList = listOf(1, 2, 3)
```

```
val numSet = setOf(4, 5, 6)
```

```
val numMap = mapOf("a" to 10, "b" to 20, "b" to 30)
```

# Break

# Exploring Layouts in Android

android



# What is a Layout ?

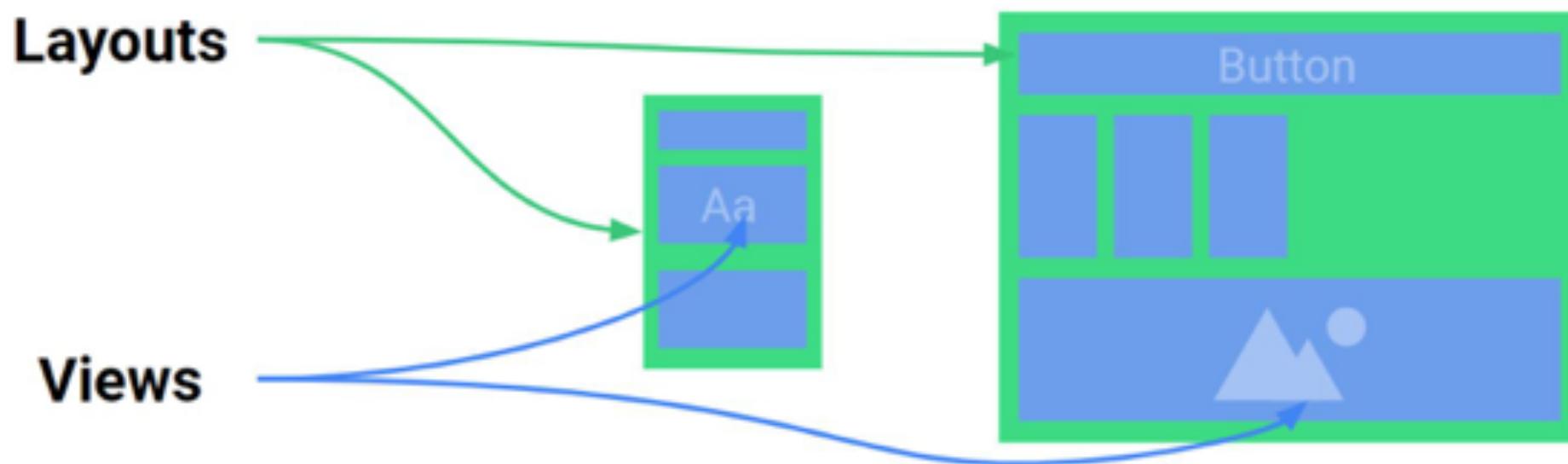
A layout defines the structure for a user interface in your app.

# What is a View ?

A View is something which a user can see, or interact with.



# Android User Interface – An Illustration



android



# LinearLayout v/s RelativeLayout



LinearLayout is a view group that aligns all children in a single direction, vertically or horizontally.



RelativeLayout is a view group that displays child views in relative positions.



Hello Android !

**TextView**



**ImageView**

**android**



**SEND**

**Button**



# XML - The UI Language of Android

Ready for a little bit of coding ?  
Don't be scared, It's easy !



# Understanding Basic Code Structure



## Key Terms :

- View
- ViewGroup
- Parent & Child Views
- View ids
- Mandatory layout attributes

```
● ● ●  
<?xml version="1.0" encoding="utf-8"?>  
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
    android:layout_width="match_parent"  
    android:layout_height="match_parent"  
    android:orientation="vertical" >  
  
    <TextView android:id="@+id/text"  
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content"  
        android:text="Hello, I am a TextView" />  
  
    <Button android:id="@+id/button"  
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content"  
        android:text="Hello, I am a Button" />  
  
</LinearLayout>
```

# Understanding Basic Code Structure



## Key Terms :

- View
- ViewGroup
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- View ids
- Mandatory layout attributes

```
● ● ●  
<?xml version="1.0" encoding="utf-8"?>  
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
    android:layout_width="match_parent"  
    android:layout_height="match_parent"  
    android:orientation="vertical" >  
  
    <TextView android:id="@+id/text"  
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content"  
        android:text="Hello, I am a TextView" />  
  
    <Button android:id="@+id/button"  
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content"  
        android:text="Hello, I am a Button" />  
  
</LinearLayout>
```

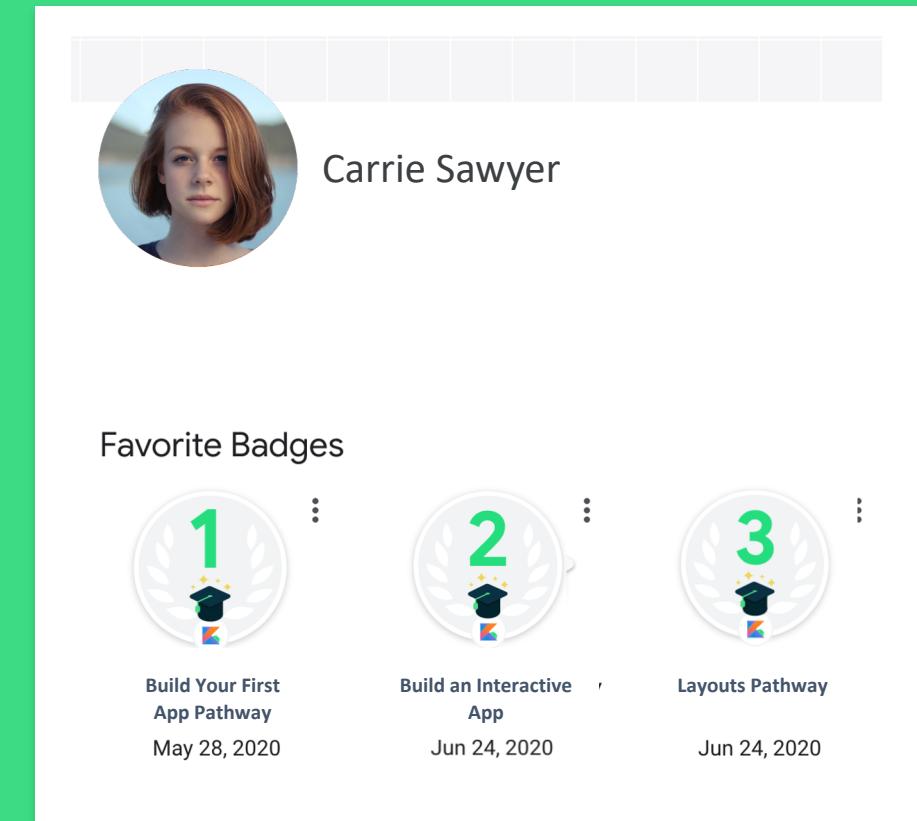
# Let's get started

**Start here:**  
[g.co/android/studyjams](https://g.co/android/studyjams)

**Collect your first  
badge!**



# Create a Developer Profile



Carrie Sawyer

Favorite Badges

- 1 Build Your First App Pathway May 28, 2020
- 2 Build an Interactive App Jun 24, 2020
- 3 Layouts Pathway Jun 24, 2020

# New to Programming track

Start Course

The image shows a laptop screen with the Google Developers website open. The main header includes the 'developers' logo, a search bar, and navigation links for Platform, Android Studio, Google Play, Jetpack, Kotlin, Docs, and News. A banner at the top states, "Google is committed to advancing racial equity for Black communities. [See how.](#)" Below this, the 'Android Study Jams' section is prominently displayed. It features a large 'Kotlin' logo icon. The section title is 'Android Study Jams' and a subtext reads, "Become an Android Developer. Learn how to build Android apps in Kotlin by following an online curriculum together with a study group. This program is for people who are new to Android." Two main call-to-action boxes are shown: one for 'New to programming?' and another for 'Prior programming experience?'. Both boxes contain descriptive text and a green 'START COURSE' button. At the bottom of the page, there are social media links for Twitter and YouTube.

developers

Platform Android Studio Google Play Jetpack Kotlin Docs News

Google is committed to advancing racial equity for Black communities. [See how.](#)

## Android Study Jams

Become an Android Developer. Learn how to build Android apps in Kotlin by following an online curriculum together with a study group. This program is for people who are new to Android.

**Kotlin**

### New to programming?

If you are new to programming, the Android Basics in Kotlin course will show you how to build simple Android apps using the Kotlin programming language and Android Studio. No prior programming experience is necessary. You will be introduced to basic programming concepts as you learn about Android.

**START COURSE**

### Prior programming experience?

If you have prior programming experience but are new to Android and the Kotlin programming language, take this track. First, you will learn the syntax and features of Kotlin by solving these Kotlin Koans exercises. Note: this brings you to an external kotlinlang.org site that is developed by JetBrains.

**START KOTLIN KOANS**

Once you know the basics of Kotlin, dive into the Android Kotlin Fundamentals course to build a variety of Android apps in Kotlin. You'll learn about UI layouts, app architecture, data storage, connecting to the network, and more best practices for Android development.

**START COURSE**

Follow @AndroidDev on Twitter

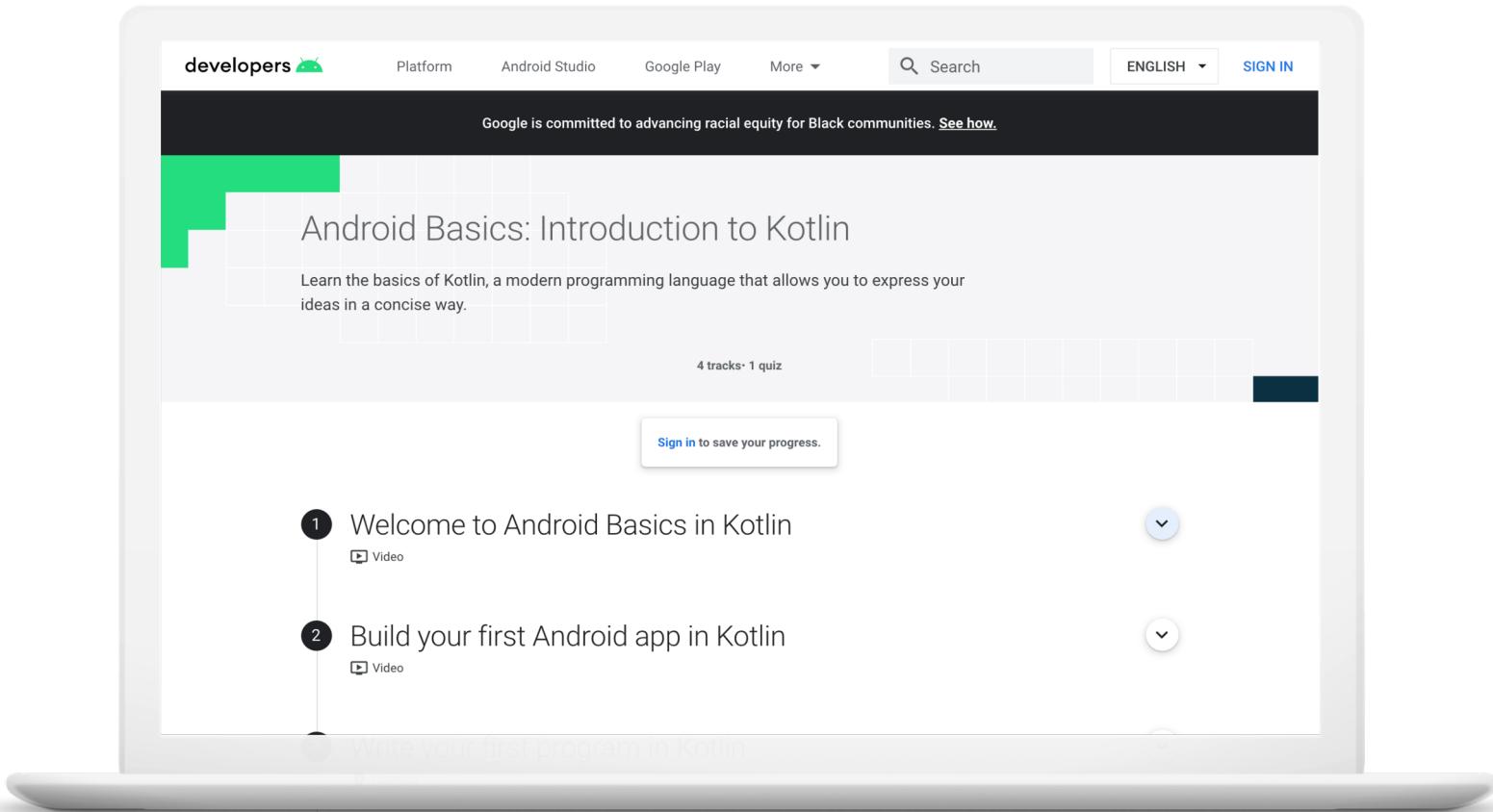
Check out Android Developers on YouTube

# New to programming? Start Here

Go to [g.co/android/studyjams](https://g.co/android/studyjams)

Start Android Basics in Kotlin Course

Work on Unit 1, Pathway 1



# Prior Programming Experience track:

## Start Kotlin Koans

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developers

Platform Android Studio Google Play Jetpack Kotlin Docs News

Search

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[START KOTLIN KOANS](#)

 Twitter  
Follow @AndroidDev on Twitter

 YouTube  
Check out Android Developers on YouTube

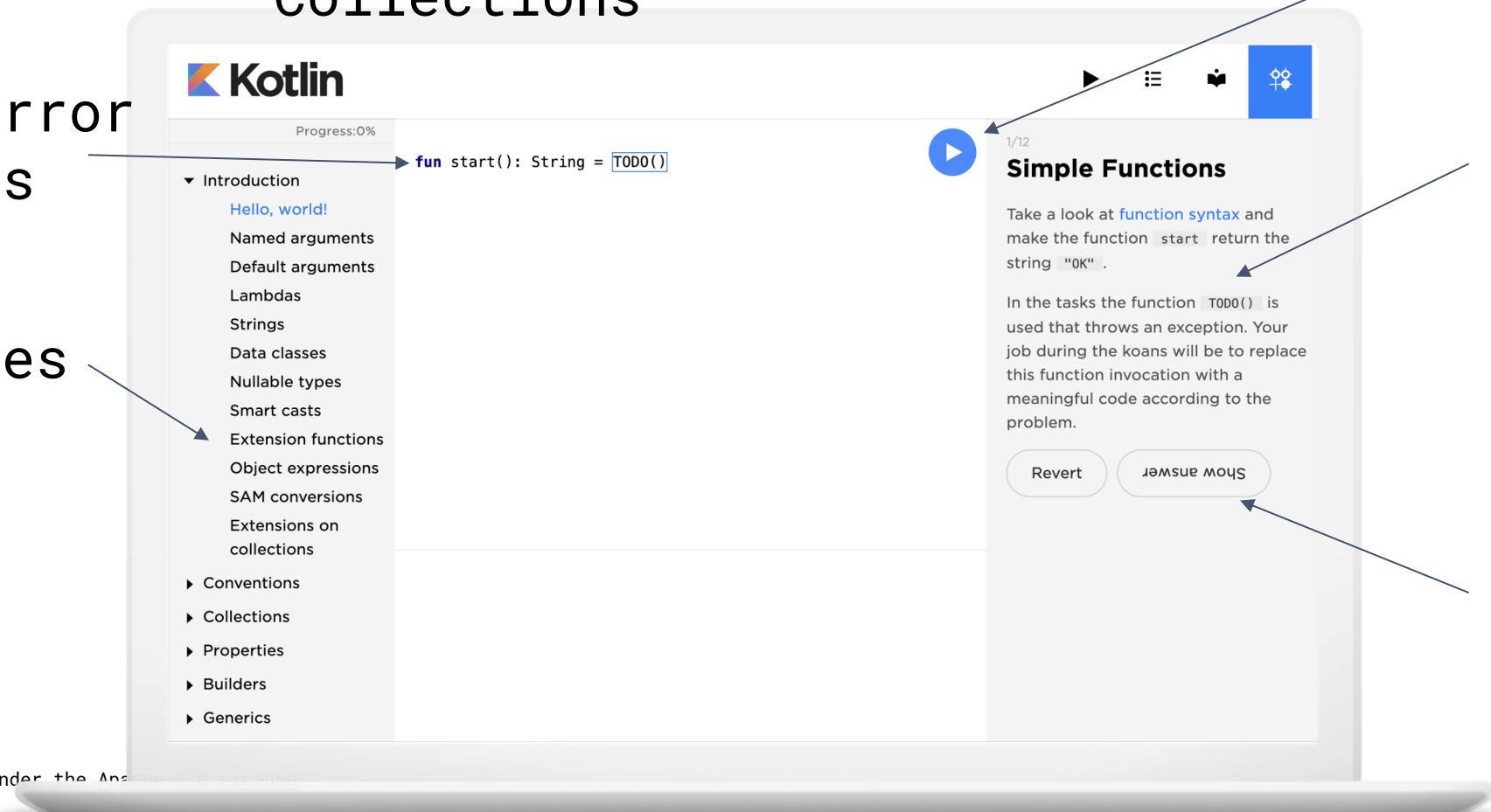
# Coders: Start Here

Go to [g.co/android/studyjams](https://g.co/android/studyjams) and start Kotlin Koans

## Introduction, Conventions, Collections

Check Error  
Messages

Exercises



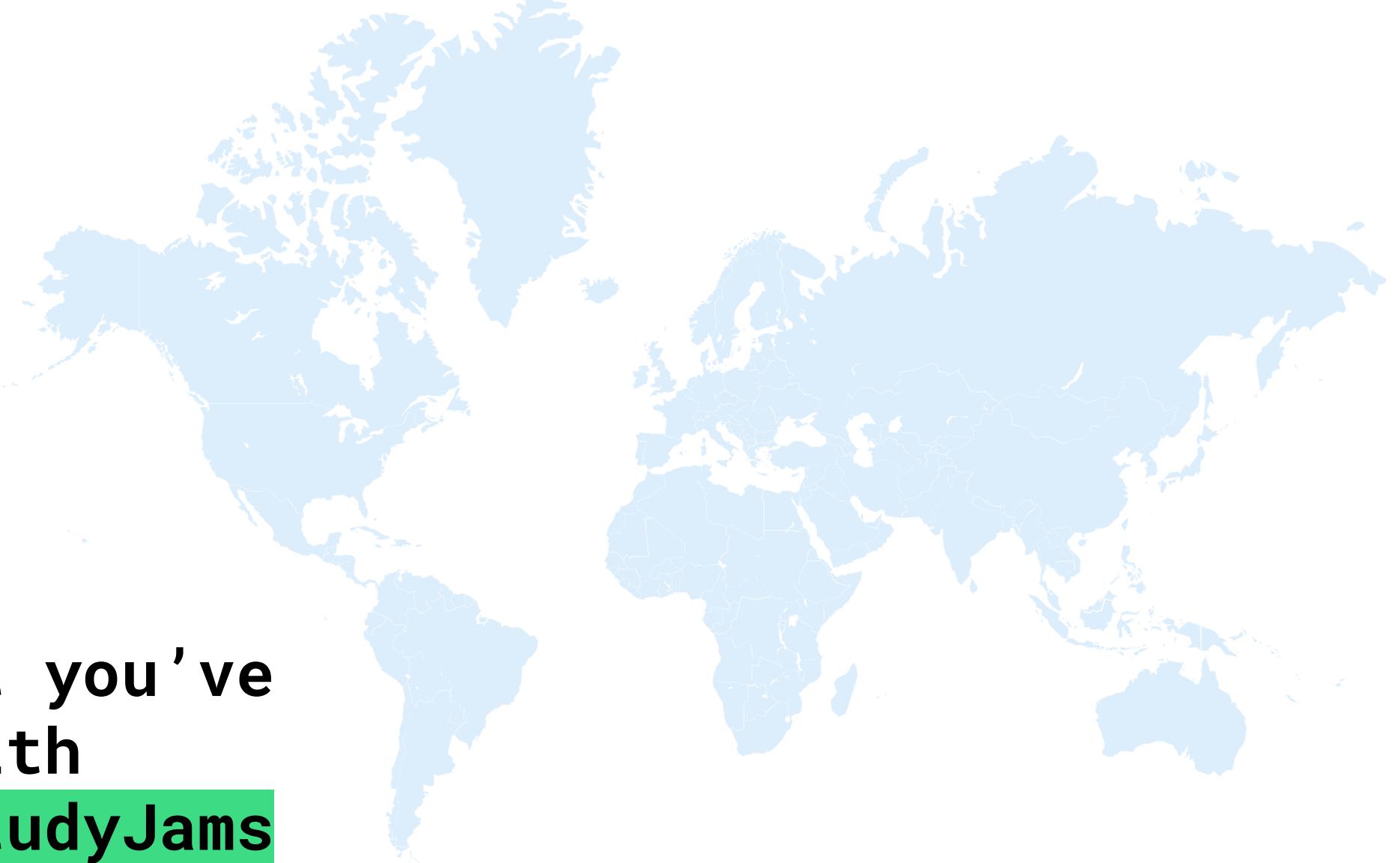
Run Code &  
Check  
Output

Re-read  
Instructions

Show  
Answers

android

# Thanks !



**Share what you've  
learned with  
**#AndroidStudyJams****

# Additional Resources

## Online curriculum

- [Android Basics in Kotlin Course](#)
- [Android Kotlin Fundamentals Course](#)

## Kotlin Language Resources

- [Official Kotlin Language website](#)
- [Kotlin Learn by Example](#)
- [Kotlin Vocabulary series](#)

## Android Resources

- [Official Android Developers website](#)
- [Android Developers YouTube channel](#)
- [Android Developers Twitter](#)
- [Android Developers Medium blog](#)
- [Android Developers Official blog](#)
- [Android Developers Newsletter](#)
- [Android Codelabs](#)
- [Android GitHub page](#)

# Let's Play!

To find slides, content, links and more relating to  
Android Study Jams visit the repo   
[github.com/beauwilliams/Android-Study-Jams](https://github.com/beauwilliams/Android-Study-Jams)

